Art. V.—*New or Little-known Victorian Fossils in the National Museum.*

Part II.—Some Silurian Molluscoidea.

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(With Plates X., XI., and XII.).

[Read 14th May, 1903].

Certain of the species herein described as new forms undoubtedly show a more or less close relationship to well-known European and North American types, both as to their general features and superficial ornament. The Victorian examples are here regarded as distinct only when they exhibit constant and well-marked, though often minute, characters of their own. At the same time it is our aim to point out their relationships, in order that the homotaxial affinities between the southern and northern forms may be kept in view. It should be remembered, however, that the value of a correlation between limited horizons in widely separated areas is liable to be unduly overestimated, since we have conclusive proof afforded us, by the detailed study of certain groups of Australasian fossils, as the Graptolites and the Glossopteris flora, that formations which appear distinct in the southern area include fossils which in the northern hemisphere, and especially in Europe, would be regarded as representing a mixed fauna or flora. In other words certain types of fossils occurring in older or younger formations in Europe or India, may, in Australia be associated together in the same stratigraphical series.[1]

The species now under description fall into one or other of the two series of the Silurian, as defined by Professor J. W. Gregory,[2]

[1] For a further discussion on this subject see T. S. Hall's Presidential Address, Section C, Austral. Assoc. Adv. Sci., Hobart Meeting, 1901, p. 165.

[2] J. W. Gregory: "The Heathcotian," Proc. Roy. Soc. Victoria, n.s., vol. xv., pt. ii., pp. 170-3.

MELBOURNIAN.

Lingula spryi, sp. nov.
,, latior, sp. nov.
Siphonotreta australis, sp. nov.
Orbiculoidea selwyni, sp. nov.
Craniella lata, sp. nov.
Chonetes melbournensis, sp. nov.

YERINGIAN.

Fenestella margaritifera, sp. nov.
,, australis, sp. nov.
Stropheodonta (Brachyprion) lilydalensis, sp. nov.
,, (Leptostrophia) alata, sp. nov.
Strophonella euglyphoides, sp. nov.
Plectambonites transversalis, Wahlenberg, sp.
,, cresswelli, sp. nov.
Chonetes robusta, sp. nov.
cresswelli, sp. nov.
Uncinulus stricklandi, Sow. sp.

Class POLYZOA.

Genus *Fenestella*, Lonsdale.

Fenestella margaritifera, sp. nov. (Pl. X., Figs. 1-3).

Specific characters.—Zoarium funnel-shaped, rather short, the height being nearly equal to the breadth at the rim. Inner (poriferous) surface having straight, divergent branches; bifurcation occurring on a length of about ten fenestrules. Zooecia in two series on either side of a prominent, beaded keel, and arranged in a curve close to the lateral borders of the fenestrules. The zooecia are prominent, papillose, with a central rounded orifice, and are usually disposed in fives on the sides of the fenestrules. The latter are elliptical, or more rarely sub-quadrate. Dissepiments at very regular intervals, and as a rule laterally coincident with one another, but occasionally alternate. External surface of the zoarium having straight branches, with rounded surfaces, and usually plain, but tending to become granulate.

MEASUREMENTS.

Average height of zoarium, 20 mm.
Average width of zoarium, 25 mm.
Diameter of a zooecium with vestibule, ·06 mm.
Number of fenestrules in a length of 10 mm. = 11 to 13.
Number of fenestrules in a width of 10 mm. = 14 to 17.

Affinities.—This species is clearly allied to F. fossula, described by Lonsdale from the Carbo-permian of New South Wales and Tasmania.[1] The latter differs however, in the smaller number of the zooecia, in their more or less parallel arrangement, in the apparent absence of a prominent vestibule (Lonsdale's fig. 1. being that of a *cast* from the celluliferous face), and in the sub-rectangular or long elliptical form of the fenestrules. The zoarium of F. fossula attains to a much larger size than F. margaritifera.

In its prominent zooecia, and the tuberculated carinae the present species belongs to the type of F. retiformis, Schlotheim.

Occurrence.—F. margaritifera appears to be of frequent occurrence (judging by the relative proportion of associated fossils, in the small collection in the National Museum from the localities cited) at the junction of the Worri-Yallock and Yarra, Geol. Surv. Victoria, B 23 [587-8]; and at Yering, Upper Yarra, Geol. Surv. Victoria [592-5].

The matrix in which these fossils occur is an ochreous and somewhat indurated clay. The fossils are represented chiefly as casts; in some instances, however, the original structure of the fossil is preserved.

Horizon.—Highest beds of the Silurian (Yeringian).

Note.—In Smyth's Progress Report, Geol. Surv. Victoria, 1874, p. 34, Sir F. McCoy recorded two new species of Fenestella from the Upper Yarra District. Up to the present, the above species is the only new form which the writer has been able to discover in the Survey collections from that locality.

Fenestella australis, sp. nov. (Pl. X., Fig. 11).

Specific characters.—Zoarium funnel-shaped, somewhat elongate; surface undulate. Inner surface with circular, open zooecia

[1] In Strzelecki's Phys. Descr. New South Wales, 1845, p. 269, pl. ix., figs. 1, 1a.

arranged in two series as in F. subantiqua, d'Orbigny and F. antiqua, Goldfuss sp.; from four to six opposite each fenestrule. Branches slender and somewhat sinuous; sharply keeled; bifurcating in an irregular manner, the angle often wide, the fission taking place usually at every fourth fenestrule. External surface non-poriferous; branches with a rounded and fairly smooth surface.

MEASUREMENTS.

Height of zoarium, about 13 mm.
Width of zoarium, about 10 mm.
Diameter of zooecium, .08 mm.
Average number of fenestrules in a length of 10 mm. = 8.
Average number of fenestrules in a width of 10 mm. = 12.

Affinities.—In F. morrisii from the Upper Palaeozoic of Burragood, New South Wales,[1] we have a similar kind of branching, but the zooecial arrangement is not so regularly serial as in our species, and the branches have a feebly developed carina. The nearest allied form to ours seems to be F. multiporata, de Koninck (non McCoy),[2] especially with reference to its strong carina and regularly arranged pores. The fenestrules are, however, elongate rectangular in the latter species, whilst in F. australis they are sub-rectangular to sub-elliptical, and further, the dissepiments in the latter form are wider.

F. adraste, Hall and Simpson,[3] from the Lower Helderberg Group, near Clarksville, New York, bears close comparison with our form; the fenestrules, however, are smaller and more ovate, whilst the zooecia are not so numerous, and the carina flattened externally.

Occurrence.—In the dark bluish limestone of Deep Creek, seven miles to the south-east of Walhalla, Gippsland. The material was collected and presented by the Rev. A. W. Cresswell, M.A. [589-91]. Also figured specimen [1205A].

Horizon.—Silurian (Yeringian).

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1 McCoy, 1884, Syn. Carb. Foss. Ireland, p. 203, pl. xxviii., fig. 13. de Koninck, 1877, Pal. Foss. New South Wales (Transl. by David and Dun, 1898), p. 135, pl. vii., fig. 8.

2 *Op. cit.*, 1898, p. 134, pl. viii., fig. 4.

3 Natural History of New York, vol. vi., 1887, p. 48, pl. xx., figs. 19-22.

Class BRACHIOPODA.

Genus *Lingula*, Bruguière.

Lingula spryi, sp. nov. (Pl. X., Figs. 9, 9*a*).

Specific characters.—Valves subovate, sides evenly rounded, with an acuminate border below the beak; the latter only very slightly ridged; broadly rounded anteriorly. Surface depressed convex, highest at the posterior third of the length, thence gradually sloping and becoming flattened towards the anterior border. Surface smooth, with numerous, but rather faint growth-lines. A faint frilling on the anterior margin, and on one or two of the curved areas between the growth-lines in the median region of the valve may be seen when the light is directed across the shell.

MEASUREMENTS.

Length of largest specimen - -	7.6 mm.
Width of largest specimen - -	6 ,,
Thickness of united valves, about -	1.2 ,,

Affinities.—The broadly spatulate form of the valve in this species recalls some of the broader varieties of L. attenuatus, Sowerby,[1] but the latter form is typically narrower and more acuminate posteriorly. Another form with which ours may be compared, especially with regard to the surface convexity, is L. symondsi, Davidson.[2] The noteworthy differences which separate L. spryi from these species are the evenly rounded and almost circular anterior margin, and the radial frilling of the surface between the growth-lines. Lastly the L. perlata, J. Hall,[3] from the Helderberg group of Albany, U.S.A., resembles our form in the general outline of the valves, excepting that the above-named species has not such an evenly rounded anterior margin, whilst the concentric lines of growth are more deeply sculptured.

Occurrence.—Found in the pale purplish argillaceous rock in and around Melbourne, namely, in the Swanston Street sewerage

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[1] In Murchison's Silurian System, 1839, pl. xxii., fig. 13; also Davidson, Brit. Sil. Brachiopoda, 1866 (Mon. Pal. Soc.), p. 44, pl. iii., figs. 18-27 (*c.f.*, fig. 19).

[2] L. symondsi, Davidson (Salter MS.), Brit. Sil. Brach., p. 45, pl. iii., figs. 7-17.

[3] Palaeontology of New York, 1859, vol. iii., p. 156, pl. ix., figs. 3-5.

excavations near Collins Street [598-9], and also at South Yarra (Yarra Improvements)—[596]. The similar colouration and appearance of the rock from both localities point to the probability of their being on the same geological horizon for although the Silurian rocks vary considerably in their lithological appearance in a vertical direction in these localities, they show persistent characters over the same zonal area. Collected by Mr. F. Spry, in whose honour the species is named.

Horizon.—Silurian (Melbournian).

Lingula latior, sp. nov. (Pl. X., Figs. 10, 10*a*).

Specific characters.—Valve subovate, sides sloping outwards towards the anterior border, which is broad and well-rounded; beak somewhat blunt but prominent. Surface smooth, strongly convex, and marked by a few faint growth-lines; a few radial creases start from the umbo and traverse the greater part of the shell-surface. The impressions of the pedicle and protractor muscles are faintly seen on the shell.

MEASUREMENTS.

Length of valve - - -	4	mm.
Width of valve - - -	3.6	,,
Thickness about - - -	1.3	,,

Affinities.—The form of this shell is of the L. squamiformis type[1], but it is not so straight along the posterior border. It most resembles L. lata of Sowerby[2], from the Lower Ludlow rocks of England and Scotland, but differs from it in many points, and especially in the stronger convexity of the surface.

Occurrence.—In bluish argillaceous rock, South Yarra (Yarra Improvements), Melbourne. Collected by Mr. F. Spry [59].

Horizon.—Silurian (Melbournian).

Genus *Siphonotreta*, de Verneuil.

Siphonotreta australis, sp. nov. (Pl. X., Figs. 7, 8, 13; Pl. XI., Fig. 1).

Specific characters.—Pedicle valve broadly ovate, surface highest near pedicle opening, sloping steeply to the sides and

1 Phillips: Geol. Yorkshire, 1836, vol. ii. p. 221, pl. xi., fig. 14.
2 In Murchison's Silurian System, 1839, p. 618, pl. viii., fig. 11.

gently towards the anterior border. The edges of the lateral shoulders nearly straight and meeting the boldly curving anterior margin at less than halfway from the umbo. Shell thin and wrinkled externally, boldly relieved by deep curved lines of growth, about 10 or 12, from their salient edges proceed numerous spines, of which only vestiges remain. There are also indications of surface pittings between the bases of the spines. Pedicle opening small, circular, and with a depression indicating the position of the underlying pedicle tube which proceeds from it anteriorly (Fig. 8). Dorsal valve smaller, depressed-convex, and sub-circular in form. The internal cast of the pedicle valve shows the position of the foramen at the summit of the valve, and a deep groove, the impression of the tubular canal.

Measurements.

Length of a pedicle valve - - - -	14	mm.
Width of a pedicle valve - - - -	12.5	,,
Length of a brachial valve - - - -	11	,,
Width of a brachial valve - - - -	9.5	,,
Length of a large brachial valve (figured) -	14	,,
Width of a large brachial valve (figured) -	14.5	,,

Affinities.—In some respects S. australis seems related to S. anglica, Morris[1], as for example in its relatively large size, the prominent lines of growth, and the pitted shell-surface. Our specimens differ in certain points which render them specifically distinct; it is generally much larger than S. anglica, and it is not so deeply nor so numerously pitted as that species.

Occurrence.—Found in the hard black argillaceous rock, Domain Road, South Yarra (Sewerage Works), [903-609]. Also as casts, in brown micaceous sandstone, Swanston Street Sewer [600-1], and from the Sewerage Tunnel near Old Fish Market, Flinders Street [610-11]. Collected by Mr. F. Spry.

Horizon.—Silurian (Melbournian).

Genus *Orbiculoidea*, d'Orbigny.

Orbiculoidea selwyni, sp. nov. (Pl. X. Figs. 5, 6, 6*a*, 12).

Specific characters.—Pedicle valve broadly elliptical. Apex excentric, situated at less than one fourth the length of the shell

1 Ann. Nat. Hist., 2nd ser., 1849, vol. iv., p. 320, pl. vii., figs. 1*a-e*.

from the posterior margin, directed backward. Foramen elliptical, with a post-apical groove which partially interrupts the lines of growth passing down towards the posterior margin, and emerging on the interior in a sipho. Surface gently convex on the anterior slope, abruptly depressed in the post-apical region. Surface with numerous, fine, concentric growth lines. Outline of brachial valve broadly elliptical; apex centric, conical and strongly convex anteriorly, somewhat depressed in the post-apical region, but recovering its convexity near the posterior margin. Concentric lines of growth distinct.

The figure (5) of the pedicle valve is from an obliquely crushed specimen.

Measurements.

Length of pedicle valve figured - -	6.5 mm.
Width of pedicle valve figured - -	3 ,,
Length of brachial valve figured - -	6 ,,
Width of brachial valve figured - -	4.5 ,,
Height of brachial valve figured - -	1.5 ,,

Observations.—The genus Orbiculoidea has been usually regarded by palaeontologists as a sub-section of Discina, Lamarck. The researches of Mr. W. H. Dall[1], tend to show that the type species of Discini is D. striata, Schumacher sp. (non Sowerby) = D. ostraeoides, Lam., a recent form from West Africa and apparently the only representative of the genus. One of the chief distinctions between Discina and Orbiculoidea, pointed out by Messrs. Hall and Clarke[2], is the relative position of the perforation and and the direction of the pedicle furrow and tube. In Discina the pedicle valve is perforated behind the apex and the pedicle emerges antero-posteriorly. The reverse is the case in Orbiculoidea, the pedicle furrow, situated just below and behind the apex and extending over a greater or less portion of the valve, emerging postero-anteriorly. The furrow terminates in a tubular sipho which nearly reaches the margin of the shell Often there is a callosity surrounding the greater part of the internal tube. This structure is well shown in one of our specimens (Fig. 12).

[1] Bull. Mus. Comp. Zool., Harvard College, 1871, vol. iii., No. 1. Hall and Clarke: Palaeontology of New York, 1892, vol. viii., Palaeozoic Brachiopoda, pt. i., p. 121.

[2] *Op. cit.*, p. 125.

Messrs. Hall and Clarke have further advocated the advisability of separating the known types of Orbiculoidea into two groups; Orbiculoidea *sensu stricto* would then include the forms which have the pedicle valve convex or flattened, and the brachial valve conical; the sub-genus Schizotreta of Kutorga embracing those forms in which the pedicle valve is conical, and the brachial depressed convex.

The above species is named in honour of the late Dr. A. R. C. Selwyn, under whose auspices this and many other specimens in the Museum were collected, and whose early mapping of Victoria remains as a splendid testimony of conscientious pioneering work.

Occurrence.—The specimens of Orbiculoidea selwyni in the National Museum are from the Geological Survey collections from Merri Creek, Parish of Merriang Bb 6 [613-4]; and from Merri Creek, Kalkallo, Bb 3 [612].

In the former instance they are found in an ochreous coloured sandy and micaceous rock, and in the latter in a fine blue-grey sandstone.

Horizon.—Silurian (? Yeringian).

Genus *Craniella*, Oehlert.

Craniella lata, sp. nov. (Pl. X., Figs. 4, 14).

Specific characters.—Shell sub-quadrangular, moderately large, broader than long. Dorsal surface rising from behind forward to two-thirds the length when it curves steeply to the anterior border. Sides somewhat steeply sloped. The surface of the dorsal valve rather depressed in the central area; marked by one or two striae parallel with the posterior border. The upper valve in the type specimen is practically represented as a cast of the internal surface. The impressions of the posterior adductors are shown as small trigonal depressions; the two sub-centrals are apparently confluent, though not well seen in the specimen, being represented by a crescentic excavation. Faint indications of the vascular sinuses on the steep lateral margins of the specimen, nearly concentric with the lateral shell-margin and emitting secondary branches from both sides.

Measurements.

Length of shell	6.5 mm.
Width	10 ,,
Greatest height from surface of attachment	1.5 ,,

Affinities.—Although the general characters of our specimen come well within the genus, there are no closely related forms among the few species of Craniella yet described.

Probably the nearest allied form is the variable species from the Hamilton group of New York State, namely C. hamiltoniae, J. Hall[1]. Our specimen, however, is much broader, with a longer posterior border, and having concentric rather than strongly sigmoidal sinuses.

Observations.—This genus has hitherto been recorded only from Ordovician (doubtfully) and Devonian strata in North America and Europe, and thus its occurrence for the first time in Australia is further interesting from the fact that it apparently fills in the gap in its geological range, if the Ordovician occurrence can be proved.

Occurrence.—Our example of the above species was found attached to the external surface of a species of Cycloceras, from the fine blue-grey argillaceous rock near the Botanical Gardens, South Yarra, Melbourne. It was found during the work on the Yarra Improvements. Collected by Mr. F. Spry [896].

Horizon.—Silurian (Melbournian).

Genus *Stropheodonta*, J. Hall.

Sub-genus *Leptostrophia*, Hall and Clarke.

Stropheodonta (Leptostrophia) alata, sp. nov. (Pl. XI., Figs. 6, 7).

Specific characters.—Shell semi-circular, broadly rounded anteriorly, cardinal margins produced and alate at the extremities; width greater than the length, valves depressed plano-convex. Hinge line nearly straight. Denticulations of the cardinal area extending to more than one half the entire length of the hinge. Impression of posterior adductors strong, with a finely grooved

[1] See Hall and Clarke, *op. cit.*, pl. iv., l., figs. 3-16.

surface of attachment. Surface of valves concentrically undulate, finely lineated radially from the umbo to the anterior margin; between the radii, the surface upon magnification is seen to be traversed by numerous excessively fine striae. Shell structure, seen in partially decorticated specimens, coarsely punctate.

Measurements.

A large specimen	- -	width 44 mm.
		length 23 ,,
Another specimen	- -	width 28 ,,
		length 16 ,,

Affinities.—In outline our species is rather like Stropheodonta ornatella, Davidson sp. (Salter MS.)[1], but the latter has longer valves, and the extremities of the cardinal margin are not so acuminate. The two forms also differ in the character of the surface striae, S. ornatella having them much coarser in the form of primary and secondary riblets.

Another closely related form, and one typical of the sub-genus is Stropheodonta (Leptostrophia) filosa, Sowerby sp., of the Wenlockian and Gotlandian in Europe[2]; especially with regard to its fine ornamentation of radii. The latter species however has the cardinal extremities much less produced, is proportionately longer, and the primary radii are far more numerous.

Occurrence.—North of Lilydale. Specimens presented by the Rev. A. W. Cresswell, M.A. [665-6]; [659]; [1421]. Also Geol. Surv. Vict. B 23, Junction of Woori Yallock and Yarra [657-8]. In both cases the specimens occur in a kind of ochreous mudstone, the rock in the latter instance being much more indurated.

Horizon.—Silurian (Yeringian).

Sub-genus *Brachyprion*, Shaler.

Stropheodonta (Brachyprion) lilydalensis, sp. nov. (Pl. XI., Fig. 5).

Specific characters.—Shell semi-circular, broadly rounded anteriorly, with the cardinal extremities somewhat produced and

1 Strophomena ornatella (Salter MS.) Davidson, 1871, Brit. Sil. Brachiopoda (Pal. Soc. Mon.). No. 4, p. 309, pl. xliii., figs. 16-20.

2 Orthis filosa, Sowerby, 1839, in Murchison's Silurian System, pl. xiii., fig. 12; Strophomena filosa, Sow., sp., Davidson, 1871, Brit. Sil. Brach., No. 4. p. 307, pl. xliv. figs. 14-20. Stropheodonta (Leptostrophia) filosa, Sow. sp., Hall and Clarke, 1892, Paleontology of New York, Brachiopoda, pt. i. p. 288.

pointed. Brachial valve nearly flat, slightly concave at the anterior margin. Cardinal process rather prominent. Adductor impressions small and faint. Hinge line with indications of denticulae near the umbo. Surface of shell with prominent and numerous radii, fasciculate near the umbo, stronger and bifurcating near the anterior margin; .5 mm. apart in the median area of shell. Between the radii of the umbonal half of the shell there are closely set concentric wrinkles or undulations. Shell structure coarsely punctate. Ventral valve not seen.

MEASUREMENTS.

Length - - - -	20 mm.
Width - - - -	28 „

Affinities.—This species agrees in the details of the surface ornament with Stropheodonta (Brachyprion) varistriata, Conrad[1] from the Lower Helderberg Group, New York; but with regard to the relative shape of the shell all the specimens of the latter species which have been figured appear to be much longer than our specimen in proportion to the width. The posterior adductor impressions in our specimen also differ from those of S. varistriata, being much shorter and broader. The limited extent of the denticulated area of this fossil shows its relationship with the earlier or Silurian types of Stropheodontae for which Professor Shaler proposed the generic or sub-generic term Brachyprion[2].

Occurrence.—North of Lilydale. Presented by Rev. A. W. Cresswell, M.A. [660].

Horizon.—Silurian (Yeringian).

Genus *Strophonella*, J. Hall.

Strophonella euglyphoides, sp. nov. (Plate XI., Figs. 3-6).

Specific characters.—Shell semicircular in outline. Ventral valve concave, slightly convex at the umbo. Dorsal valve flat or slightly hollowed at the umbonal region, and sharply bent back anteriorly. Cardinal extremities produced and pointed,

1 See Hall and Clarke, 1892, Palaeontology of New York Palaeozoic Brachiopoda, pt. i., pl. xiii., figs. 6-16.

2 Bull. Mus. Comp. Zool., 1865, vol. i., p. 63.

more especially in the brachial valve, the margin of which appears to curl round to enclose the edge of the narrower ventral valve. Marginal area of valves crenelate. Surface of valves marked by strong fasciculate radii, about nine in the space of 10 mm. in the central area, these in turn being further subdivided at 5 mm. from the anterior margin; also with transverse, concentric lines which break, to some extent, the continuity of the radii. Muscular areas of both dorsal and ventral valves well-marked and bordered prominently; those of the dorsal elevated and divided by a central ridge.

Measurements.

Dorsal valve of a large specimen,	length -	28 mm.
	width - -	54 ,,
	depth about	19 ,,
A ventral valve - - -	length -	35 ,,
	width - -	45 ,,

Affinities.—The nearest allied form to the above is undoubtedly Strophonella euglypha, Hisinger sp.,[1] both in shape, structure, and general markings. The chief differences are, the comparative flatness of the ventral valve and the striking geniculation of the dorsal valve and also the larger number of radii in S. euglyphoides. The European species is proportionately longer than the present one, and the concentric undulations on the shell surface more numerous. The muscular areas of the dorsal valve are shorter and deeper in S. euglyphoides.

Occurrence.—North of Lilydale; in a hard ochreous mudstone. Presented by Rev. A. W. Cresswell, M.A. [688-701]. Also Geol. Surv. Victoria, Parish of Yering, sect. 12 [678-81].

Horizon.—Silurian (Yeringian).

Genus *Plectambonites*, Pander.

Plectambonites transversalis, Wahlenberg sp.

Anomites transversalis, Wahl., 1821, Acta Upsal., vol. viii., p. 64, No. 4. Leptaena transversalis, Wahl. sp., Dalman, 1828,

1 Leptaena euglypha, Hisinger, 1819, Antecken, pl. vi., fig. 4. Strophomena euglypha, His. sp., Davidson, 1871, Brit. Silurian Brachiopoda, No. iv. (Pal. Soc. Mon.), p. 288, pl. xl., figs. 1-5. Strophonella euglypha, His. sp., Hall and Clarke, 1892, Pal. N.Y., Palaeozoic Brachiopoda, pt. i., pp. 279, 292.

Vet. Akad. Handlingar, p. 109, pl. i. fig. 4. Davidson, 1871, Brit. Sil. Brach., No. 4 (Pal. Soc. Mon.), p. 318, pl. xlviii., figs. 1-9.

The convex pedicle valve of our specimen is not so strongly globose as that of typical specimens, but in other respects it is quite comparable with the European and American examples. The valve is relieved by eleven fine but distinct and ridgelike radii, between which the shell surface is crossed by about 8-10 very fine radiating lines.

MEASUREMENTS.

About 12 mm. long; 14 mm. wide.

Observation.—P. transversalis is a well-defined and common form in the Niagara group of North America, and in the Silurian (Gotlandian) of the British Islands, the continent of Europe (Norway and Bohemia), and the Island of Gotland.

Occurrence.—In dark bluish limestone, Deep Creek, seven miles S.W. of Walhalla, Gippsland. Presented by Rev. A. W. Cresswell, M.A. [668].

Horizon.—Silurian (Yeringian).

Plectambonites cresswelli, sp. nov. (Pl. XI., Figs. 8-10).

Characters of the ventral valve.—Outline nearly semi-circular, hinge line straight, but little transgressed by the umbo; cardinal extremities angular and not much produced. Sub-globose, nearly as deep as P. transversalis. Surface with about eleven distinct, threadlike radii, the spaces between the riblets occupied by about 9-12 fine parallel striae. The intercostal surface undulate, the depressions curved, concave anteriorly, and at somewhat equidistant intervals, those on the highest part of the valve about .3 mm. apart.

MEASUREMENTS.

Approximate, as the valve is slightly imperfect.

Length - - - -	5.5 mm.
Width - - - -	9 „
Depth of ventral valve -	2.5 „

Observations.—This species resembles in its superficial ornament both Plectambonites corrugata, Portlock sp.,[1] and P. interstrialis, Phillips sp.[2] Our specimen is more globose in the ventral valve than either of the species just mentioned. As regards the ornament P. corrugata has both primary and secondary radii, and from four to seven intercostal striae, whilst the Gippsland species has the costae running the entire length of the valve and the intercostal striae are nearly twice as many. It differs from P. interstrialis in much the same details, and also in having a proportionately longer shell. It is noteworthy that P. corrugata is found in the Llandeilo and Bala series (Ordovician) in the British Islands, and also in Bohemia, whilst P. interstrialis comes from the middle Devonian of Devonshire and the Eifel.

Occurrence.—In a dark blue limestone, having a semi-crystalline appearance due to numerous cleavage surfaces of crinoidal joints and ossicles. Deep Creek, seven miles S.W. of Walhalla, Gippsland. Collected and presented to the National Museum, together with other specimens of much interest from the same locality, by the Rev. A. W. Cresswell, M.A., in whose honour the species is named [669-70].

Horizon.—Silurian (Yeringian).

Genus *Chonetes*, Fischer.

Chonetes melbournensis, sp. nov. (Plate XI., Figs. 2-4).

Specific characters.—Shell transversely elongate, semi-circular in outline; sub-plano-convex. Brachial valve approximately flat or only slightly concave; surface with numerous fine threadlike and radial striae; cardinal process prominent. Pedicle valve with surface traversed by 7 or 8 threadlike radii and numerous finer striations in the interspaces. Sometimes the radii are obsolete, the fine striae alone prevailing. Posterior margin of the pedicle valve bearing about 10 slender spines, often having a

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[1] *Orthis corrugata*, Portlock, 1843, Rep. Geol. Londonderry, etc., p. 450, pl. xxxii., figs. 17, 18. *Strophomena corrugatella*, Davidson, 1871, Brit. Sil. Brach., No. iv. (Pal. Soc. Mon.), p. 301, pl. xli., figs. 8-14.

[2] *Orthis interstrialis*, Phillips, 1841, Palaeozoic, Foss. of Cornwall, Devon, and West Somerset, p. 61, pl. xxv., fig. 103. *Leptaena interstrialis*, Phil. sp., Davidson, 1865, Brit. Dev. Brach. (Pal. Soc. Mon.), p. 85, pl. xviii., figs. 15-18.

length of half that of the shell, and set almost at right angles to the hinge line, with a slight outward curve. Under a fairly high magnification the shell surface between the striae is seen to be irregularly pitted, and the striae themselves are bridged over by oblique curved cross ridges.

MEASUREMENTS.

An average specimen -	-	length 5.7 mm.
		width 10 „
A larger specimen -	-	length 7 „
		width 12.5 „
A small specimen -	-	length 5 „
		width 8.5 „

Affinities.—The only species with which our specimens appear likely to be confused is Chonetes striatella, Dalman sp.[1] The latter has, however, a more transversely elongate shell, a distinctly concave brachial valve, and spines set at a wide angle with the ventral umbo.

Observations.—McCoy has recorded Chonetes minima, Sow. sp.,[2] from Victoria; and on the maps of the Geol. Surv. of Victoria, Quarter-sheet, No. 3, N.E., in a note on the fossils at Bruce's Creek, near Mount Disappointment, he records Leptaena allied to minima, Sow.;[3] also on Quarter-sheet, No. 4, S.W., at Broadhurst's Creek, S.E. of Kilmore, locality Bb 18, both Chonetes and Leptaena are recorded, as well as a Leptaena at Dry Creek, Bb 19. It is worthy of note that a specimen of Chonetes has been found in the Survey collections at the Museum, labelled as such by McCoy, from locality Bb 18 [874], and this is identical in every respect with Chonetes melbournensis. Whether the Chonetes minima is represented in the Museum collection remains to be discovered, but certain it is that the Broadhurst Creek specimen is not referable to the latter form, which differs in many respects from C. melbournensis in point of size, being much smaller and often less than half the width, in the greater

[1] *Orthis striatella*, Dalman, 1827, Kongl. Akad. Handlingar, p. iii., pl. i., figs. 5*a-d*. *Chonetes striatella*, Dalm. sp., Davidson, 1871, Brit. Sil. Brach., No. 4 (Pal. Soc. Mon.), p. 331, pl. xlix., figs. 23-26. Zittel-Eastman, 1900, Text-book of Palaeontology, p. 317, fig. 529A.

[2] *Leptaena minima*, Sow., McCoy, in Smyth's Progress Report, 1874, p. 34.

[3] In Murchison's Silurian System, 1839, pl. xiii., figs. 4, 4*a*.

concavity of the brachial valve, and in the larger number of radii.

Occurrence.—In the brown and blue hardened clays of Melbourne; South Yarra Improvements [634-8]; South Yarra sewerage tunnel, Domain Road, presented by Mr. F. Spry [630-3]; sewerage tunnel near the Old Fish Market, Flinders Street [1419]; sewerage tunnel, Swanston Street, near the Cathedral [621-7]; Swanston Street, sewer near Collins Street [615-20, 639-43]. Also at Broadhurst's Creek, S.E. of Kilmore, G.S.V. Bb 18 [874].

Horizon.—Silurian (Melbournian).

Chonetes robusta, sp. nov. (Plate XII., Fig. 8).

Specific characters.—Shell semi-circular, wider than long. Cardinal extremities obtusely angular, anterior margin well-rounded. Pedicle valve strongly convex with a shallow median fold; beak slightly projecting. Brachial valve concave, flattened near its cardinal extremities. Shell surface with about 36-40 well-marked, slightly sinuous and sharply ridged radii, which bifurcate close to the anterior margin. A series of hollow spines (probably eight) attached to the cardinal surface of the ventral valve, and arranged nearly perpendicular to the hinge line.

Measurements.

Length of figured specimen - -	14 mm.
Width - - - - - -	20 „

Affinities.—This and the species next to be described belong to de Koninck's group of the Striatae. The general shape and surface characters of this species in some respects resembles Chonetes minima, Sow. sp.[1], a form generally distributed through the Silurian of England and Wales. C. robusta however is altogether a very much larger form, and possesses a distinct median fold. Chonetes acutiradiata, J. Hall, of the Corniferous Limestone (Upper Helderberg—Devonian), of New York is similar in respect to the radii, but the cardinal extremities are much produced. The original figure of C. acutiradiata[2] shows it to differ from our

[1] *Loc. supra cit.*

[2] *Strophomena acutiradiata*, J. Hall, 1843, Nat. Hist. New York, pt. iv., Geology, p. 171, woodcut 67, No. 3.

species also in the arcuate border of the lateral margins, and its sharp cardinal extremities. The figure of the same species given by Hall and Clarke is more extreme, being short, and transversely elongate, with produced and sub-cylindrical extremities[1].

Occurrence.—In a hardened mudstone crowded with casts and decorticated valves of brachipods and other shells, north of Lilydale. Presented by Rev. A. W. Cresswell, M.A. [1417].

Horizon.—Silurian (Yeringian).

Chonetes cresswelli, sp. nov. (Plate XII., Fig. 7).

Specific characters.—Shell semicircular, hinge line straight, beaks only very slightly projecting; cardinal extremities obtusely angular. Pedicle valve with a well-marked median fold. Radii sharp, more numerous than in the preceding species, averaging about 56 at the margin. Shell-surface marked with one or two faint concentric lines, which do not interrupt the continuity of the radii. Eight or more hollow spines set nearly perpendicular to the cardinal line on the pedicle valve.

MEASUREMENTS.

An average specimen:—Length - - 9 mm.
Width - - 15 „

Observations.—The general characters of this and the preceding species are somewhat similar, the chief differences lying in the altogether stouter build of shell and fewer radii in Chonetes robusta. The shell in C. cresswelli is usually more elongate transversely, but is variable in this respect. The faint concentric markings on the valves of the latter form is another distinguishing character.

In the number of the radii the above species is nearly comparable with Chonetes australis, McCoy[2], from the Middle Devonian of Buchan and Lucknow, Gippsland, but there is no mesial sulcus in the pedicle valve of that species; the valve is also longer in proportion and the spines are shorter and stouter.

Occurrence.—This species is found, like the preceding, in the indurated mudstones north of Lilydale associated with Orthis,

1 *Chonetes acutiradiata*, Hall sp., Hall and Clarke, Palaeontology of New York, Palaeozoic Brachiopoda, vol. iv., pt. 1., pl. xvi., fig. 8.

2 Prodr. Pal. Vict., Decade iv., 1876, p. 17, pl. xxxv., figs. 3-5

Strophonella, Stropheodonta, Leptaena, Pentamerus, Spirifer, Cyrtolites, Bronteus, and many other fossils. Presented by Rev. A. W. Cresswell, M.A. [652-5]; [1422-3].

Horizon.—Silurian(Yeringian).

Genus *Uncinulus*, Bayle.

Uncinulus stricklandi, Sowerby sp.

Terebratula stricklandii, Sowerby, 1839, in Murchison's Silurian System, pl. xiii., fig. 19. Rhynchonella stricklandii, Sow. sp., Davidson, 1867, Brit. Sil. Brach., No. II. (Pal. Soc. Mon.), p. 166, pl. xxi., figs. 1-6 and 28. Uncinulus stricklandi, Sow. sp., Hall and Clarke, 1894, Pal. N. Y., Palaeozoic Brachiopoda, vol. iv., pt. ii., p. 195., pl. lviii., figs. 38-40.

Observations.—The two examples placed on view in the Museum seem to be quite typical of this species; the median fold is well-defined, the plications are strong and persistent to the umbo, and number about 24 on the pedicle valves.

Measurements.

Length - - - - - -	23 mm.
Width - - - - - -	30 ,,
Depth of pedicle valve about - -	11 ,,

Occurrence.—In the hardened mudstone of Yering, Upper Yarra, Geological Survey of Victoria [851-2].

Horizon.—Silurian (Yeringian).

Note to Part I. of this Series.

(Proc. Roy. Soc. Victoria, vol. xv., pt. ii., 1903., pp. 118 and 119).

The specimens of Upper Ordovician slates with Siphonotreta maccoyi which are in the Melbourne National Museum belong to the Geological Survey localities—Ba 62 and 64 as stated in the paper referred to above; but they were from the exposures on the banks of the Saltwater River, about 3 miles N.E. of Diggers' Rest, and not from Deep Creek (a tributary of the former) as one would understand from Professor McCoy's remarks. When

McCoy referred to Deep Creek as the locality for Siphonotreta (Ann. Mag. Nat. Hist., ser. 3, vol. xx., 1867, p. 201) he evidently had in mind the name Deep Creek by which the Saltwater River is sometimes known higher up, near Lancefield, and this possible explanation is further strengthened by McCoy's record of Siphonotreta on the Survey map 7 S.E. at localities Ba 61 to 63, Saltwater River, while Deep Creek has no such record. There is therefore no evident reason for the colouring of the area round Deep Creek as Lower Silurian (Ordovician).

Within the last few weeks I have found in the Museum the Survey specimens collected at the locality marked on the Geological maps Ba 60, Deep Creek ; and these consist of pieces of a conglomeratic, and sandy fossiliferous bed. The fossils are represented by casts, internal and external, of corals, mollusca and a tribolite, and their general aspect is that of the Yeringian, or uppermost Silurian, faces. These fossils will shortly be discussed in a separate paper of this series.

Corrigenda to Part I.

P. 107, line 14 from bottom, p. 108, lines 12 and 15 from top, and p. 121, line 14 from top for "proximal" read "distal."

P. 112, line 12 from bottom, for pl. "i." read "xvi."

P. 119, line 2 from top for "Deep Creek" read "Saltwater River."

P. 119, line 13 from top delete "Deep Creek."

P. 121, line 10 from top for "distal" read "proximal."

EXPLANATION OF PLATES X., XI., XII.

Plate X.

Fig. 1.—*Fenestella margaritifera*, sp. nov. Basal aspect of zoarium ; natural cast of internal, poriferous, surface. Natural size. [587].

„ 2.—*F. margaritifera*, sp. nov. Natural cast of a portion of the external, non-poriferous, surface. Natural size. [588].

Fig. 3.—*F. margaritifera*, sp. nov. Portion of poriferous surface, showing the arrangment of the zooecia and the tuberculate keel. From a wax impression. × 40. [593].

,, 4.—*Craniella lata*, sp. nov. Dorsal aspect of specimen attached to a Cycloceras. × 2. [896].

,, 5.—*Orbiculoidea selwyni*, sp. nov. Pedicle valve. × 4. [614].

,, 6.—*O. selwyni*, sp. nov. Brachial valve; 6a, ditto, side view. × 4. [612].

,, 7.—*Siphonotreta australis*, sp. nov. Pedicle valve. × 2. [605].

,, 8.—*S. australis*, sp. nov. Apical end of valve showing foramen. × 2. [603].

,, 9.—*Lingula spryi*, sp. nov. ? Ventral valve; 9a, edge view. × 3. [598].

,, 10.—*L. latior*, sp. nov. ? Dorsal valve; 10*a*, edge view. × 3. [597.]

,, 11.—*Fenestella australis*, sp. nov. Portion of zooecial surface including some of the bifurcating branches. × 7. [1205A].

,, 12.—*Orbiculoidea selwyni*, sp. nov. Internal aspect of a pedicle valve, showing the tube partially enclosed by a callus. × 15. [613].

,, 13.—*Siphonotreta australis*, sp. nov. Internal cast of a pedicle valve. × 2. [611].

,, 14.—*Craniella lata*, sp. nov. Outline sketch showing the position and form of the vascular sinuses, with the posterior and sub-central adductor impressions × $2\frac{1}{2}$. [896].

Plate XI.

Fig 1.—*Siphonotreta australis*, sp. nov. Brachial valve; a large specimen. × 2. [608]

,, 2.—*Chonetes melbournensis*, sp. nov. Interior of a brachial valve showing cardinal process. The matrix above the hinge line of the shell carries the casts of spines left by the removal of the area of the pedicle valve. × 3. [1419].

Fig. 3.—*C. melbournensis*, sp. nov. Pedicle valve. × 3. [636].

„ 4.—*C. melbournensis*, sp. nov. Portion of pedicle valve highly magnified, showing pittings and irregular, oblique, transverse ridges. × 56.

„ 5.—*Stropheodonta* (*Brachyprion*) *lilydalensis*, sp. nov. Natural mould of interior of brachial valve with traces of posterior adductor scars in relief, and impression of denticulate hinge. × 2. [660].

„ 6.—*Stropheodonta* (*Leptostrophia*) *alata*, sp. nov. Natural cast of interior of brachial valve with strong adductors. × 2. [665].

„ 7.—*Stropheodonta* (*Leptostrophia*) *alata*, sp. nov. Decorticated pedicle valve. Natural size. [666].

„ 8.—*Plectambonites cresswelli*, sp. nov. Pedicle valve. × 4. [669].

„ 9.—*P. cresswelli*, sp. nov. Cardinal view of pedicle valve. × 4. [669].

„ 10.—*P. cresswelli*, sp. nov. Portion of surface between two riblets, more highly magnified. × 28.

Plate XII.

Fig. 1.—*Stropheodonta* (*Leptostrophia*) *alata*, sp. nov. Positive impression in wax of a natural cast of the interior of a brachial valve ; with denticulate hinge line, cardinal process (j), dental sockets, and adductor impressions with grooved surfaces (a). × 2. [665].

„ 2.—*S.* (*Brachyprion*) *lilydalensis*, sp. nov. Interior of brachial valve, from a positive impression in wax. × 2. [660].

„ 3.—*Strophonella euglyphoides*, sp. nov. Profile section showing strong geniculation of the brachial valve. Natural size.

„ 4.—*S. euglyphoides*, sp. nov. Natural cast of interior of brachial valve with deep adductor impressions. Natural size. [694b].

„ 5.—*S. euglyphoides*, sp. nov. Positive cast of preceding specimen, umbonal portion ; with grooved adductor impressions, and fine lineation between the radii. × 1½. [694b].

Fig. 6.—*S. euglyphoides*, sp. nov. Pedicle valve. Natural size. [694a].

„ 7.—*Chonetes cresswelli*, sp. nov. Decorticated pedicle valve. × 2. [652].

„ 8.—*C. robusta*, sp. nov. Ventral aspect. The two valves lying in juxtaposition. × 2. [1417].

„ 9.—*Stropheodonta* (*Leptostrophia*) *alata*, sp. nov. Decorticated surface of pedicle valve, showing the interstriate surface. × 5. [1421].

[The numbers in square brackets refer to registered specimens in the National Museum.]